

ABSTRACT OF THE DISCLOSURE

Ultra-thin oxynitride layers are formed utilizing low-pressure processing to achieve self-limiting oxidation of substrates and provide ultra-thin oxynitride. The substrates to be processed can contain an initial dielectric layer such as an oxide layer, an oxynitride layer, or a nitride layer, or alternatively can lack an initial dielectric layer. The processing can be carried out using a batch type process chamber or a single-wafer process chamber.